

## College and Career Readiness and the Next Generation Science Standards (NGSS)

*A Framework for K-12 Science Education*, developed by the National Research Council (NRC), focuses on the integration of Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas that together constitute rigorous scientific literacy for all students. Students who meet these expectations will have the capacity to discuss and think critically about science related issues, and the knowledge and skills to pursue careers in science or engineering if they choose. The limited empirical research about the academic knowledge and skills necessary for success in postsecondary science courses – the definition of college-readiness in science – is consistent with this claim. In addition, preliminary discussions with higher education faculty suggest that if students meet the Next Generation Science Standards (NGSS), they will be well prepared for college-level science courses. During the development of the NGSS, this assumption will be tested by engaging postsecondary science faculty in two- and four- year colleges and in technical training programs leading to industry recognized credentials in the twenty-six states participating in this project. The general process is outlined in the following section.

### Validation Process

#### Step 1 – Review of Existing Research

The most current research regarding college and career readiness is being reviewed and will be used as a basis for the validation process. Research in regard to science readiness is limited; however a foundation upon which to base this discussion exists in the white papers that have been commissioned to review existing literature regarding the skills and knowledge that best support success in entry level college courses. These will be available during the validation process and for public use.

Initial findings show students should have knowledge of the overarching ideas in the science disciplines (e.g., chemistry, physics, earth science, etc.) and how the practices of science are situated within this content. Students are challenged to apply and build on their current knowledge and understanding and make connections to new science content and to life outside of the classroom. Students should also have a rich understanding of the nature and epistemology of science, scientific discourse, and the integration of science, technology, and society. Policy history and recommendations thus far suggest that to ensure the findings are realized, policymakers must hold students to an equitable outcome and provide students with a coherent pathway of science education from K-12.<sup>1,2</sup>

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<sup>1</sup> ACT. (2010). *Science for College and Careers: A Resource for Developers of the Next Generation Science Standards*. Unpublished manuscript, Commissioned by Achieve.

<sup>2</sup> College Board. (2010). *College readiness and science*. Unpublished manuscript, Commissioned by Achieve.

#### Step 2 – NGSS College and Career Readiness Lead State Partner Review

Teams from the Lead State Partners will convene to review college and career readiness in the NGSS. These teams will include high school curriculum specialists and post-secondary science faculty who teach entry level courses in two- and four- year colleges and in technical training programs leading to industry recognized credentials in STEM fields. During these meetings, the teams will:

- Review the draft secondary level NGSS high school standards
- Bring and review examples of student assignments and work in entry level science courses and identify the core concepts and skills necessary to do that work
- Validate and/or identify changes that may be needed in the draft science standards

#### Step 3 – NGSS College and Career Readiness Extended Higher Education Review

The NGSS team will work with national organizations of higher education faculty in each of the science domains and in STEM Networks in the states to identify a group of faculty from both two- and four-year institutions who teach entry level science courses. The findings from the Lead State Partner Review and associated research will be shared with this group as they go through a similar process to validate and/or identify changes that may be needed in the draft science standards.

#### Step 4 –NGSS Revision

The results from the three steps above will be summarized and shared with the Lead States and the writing team to make appropriate changes in the draft standards.